REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

I. Disposition of Claims

Claims 1-12 and 16 are pending in this application. Claims 1 and 16 are independent. The remaining claims depend, directly or indirectly, from claim 1.

II. Objection(s)

A. Specification

The specification was objected to for failing to include the section headings. The specification has been amended to include the various section headings. For example, the specification as amended includes the following sections— "Background of Invention," "Summary of Invention," "Brief Description of Drawings," and "Detailed Description." Accordingly, withdrawal of this objection is respectfully requested.

B. Drawings

The drawings are objected to for failing to include labels of diagrammatic blocks 43-47 and 50-52 of Figures 3 and 4, respectively. Figures 3 and 4 have been amended to include these labels, as shown in the replacement sheets. Accordingly, withdrawal of this objection is respectfully requested.

III. Rejection(s) under 35 U.S.C § 102

Claims 1-12 and 16 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,311,204 ("Mills"). This rejection is respectfully traversed.

A. The Present Invention

The present invention generally relates to a method for processing a digital picture. In one aspect, the present invention relates to a decoder used in a digital audiovisual transmission system. The decoder includes a processor and a memory. The processor of the decoder is adapted to decompress and store in the memory an image file in its substantially original format. Further, the processor is adapted to subsequently convert the image file to at least a second format for storage and display, based on a capacity of the memory and operation of the processor. Both the first and second format versions of the image file are stored in the memory contemporaneously.

In another aspect, the present invention relates to a method of digital image processing. The method includes decompressing compressed digital picture data and preparing decompressed data for display. The method further includes storing the decompressed data in its substantially original format and, subsequently, converting the decompressed data in its substantially original format to at least a second format for display, based on a capacity of a memory of the decoder and the processing. Finally, the method includes storing the second format version of the image file with the original format version of the image file contemporaneously in the memory. Advantageously, in one or more embodiments of the present invention, converting based on the capacity of the memory and the operation of the processor allows the quality of images to be maintained.

B. The Present Invention v. Prior Art

Processors in decoders tend to have limited memory and "processing power." Accordingly, these processors typically decompress and store image files in a fixed formats to accommodate the memory and processing constraints. One skilled in the art will appreciate that converting an image results in loss of image quality. However, the present invention bases the conversion of the original format to a second format on the current capacity of the memory and operation of the processor. In other words, if it is possible to display an image file in its substantially original format in view of the memory and the processor constraints, the processor displays the image "as is." On the other hand, if the display cannot be effected using the original format, the processor may convert the image in view of the memory and the processing constraints. Therefore, the present invention enables the highest quality display to be effected at any time within the memory and processing constraints of the decoder at that moment (pp. 3-4 of the instant specification).

C. Mills

Mills fails to disclose all of the elements of the present invention. In fact, Mills is completely silent to specific features of the present invention, as recited in claims 1 and 16. For example, Mills fails to disclose that "the first and the second format versions of the image file [are] being stored contemporaneously in the memory," as recited in claim 1. Additionally, Mills fails to disclose that the conversion of the image file to a second format for storage and display is "based on a capacity of the memory and operation of the processor," as recited in claim 1.

The Examiner has provided four citations that allegedly disclose the above elements of the present invention. Applicant will address each of these individually below:

Col. 8, line 33+

> 1. Set Top Box Processing System
> Fig. 1 is a block diagram of an exemplary set top box processing system 10 in accordance with the present invention. The processing system includes a network interface module (NIM) 12, which receives an input signal via a network port 14...Portions of the demodulated input signal are supplied from an output interface 18 to an ASIC processor 20 over data interface line 22. An MPEG-2 transport stream portion of the demodulated input signal is applied over line 24 to the processor 20. The portions of the demodulated input signal passing over lines 22 and 24 may be further processed by a digital video broadcast (DVB) descrambler 24 within the ASIC 20. The DVB descrambler 24 could alternatively be arranged external to the ASIC 20...

This citation generally discusses the physical connection between the diagrammatic blocks shown in Figure 1 of a receiver/decoder in Mills. Particularly, Mills discusses the input/output characteristics of the ASIC processor (20). In this citation, Mills does not disclose: either (1) a first and second file format version are stored contemporaneously in the memory, or (2) the image file is converted to a second file format version for storage and display based on the capacity of the memory and the operation of the processor.

Col. 9, line 17 (emphasis added)

> The ASIC processor 20 includes a CPU interface 32 through which the processor 20 and other elements connected thereto communicate with the CPU 30. The processing system 10 further includes a DRAM 40 which communicates via bus 28 with the ASIC processor 20. **The DRAM 40 may have a memory capacity on the order of 512 Kbytes, although it should be noted that the capacity of DRAM 40, Flash ROM 36 and other memory devices in processing system 10 may vary depending upon the memory requirements of a given application.** As will be described in greater detail below, the DRAM 40 is generally used to support CPU operations, as well as the video, graphics and ATM communication processing functions of the processor 20. The processor 20 includes a DRAM controller 42 which may control some or all of the DRAM 40 using control signals supplied via line 44. The processor 20 also includes an MPEG-2 demux 50 which receives an MPEG-2 transport stream from the NIM output interface 18 via line 26 and generates therefrom one or more MPEG-2 elementary data streams... [MPEG-2 background] (emphasis added)

Here, Mills discusses the internal components of the ASIC processor (20), which include a CPU interface (32). Mills also explains that the ASIC processor communicates with a DRAM (40) via a bus (28). Mills indicates that the size of the DRAM may be 512KB, but notes that the size of the DRAM may be smaller or larger, depending on how the DRAM is to be used.

Again, the above citation does *not* indicate that a first and second format version of an image may be stored contemporaneously in the memory. Furthermore, the above citation does not indicate that "the processor is adapted to...subsequently convert the image file to at least a second format for storage and display based on a capacity of the memory and an operation of the processor," as recited in claims 1 and 16. While Mills discloses that the size of the DRAM may vary, this is in reference to the physical properties of the system. Mills does *not* disclose that the capacity of the memory effects how or whether an image file is processed and, more particularly, converted by the processor for storage or display.

Col. 12, line 27+ (emphasis added)

> 2. Graphics Processor
>
> The set top box processor 20 includes a graphics processor 60 which can be configured to support a variety of graphics modes and resolutions. An exemplary embodiment may support a background plane, a decoded video plane, a graphics plane and a hardware cursor. The graphics plane may be arranged to support multiple resolutions of pixel size and aspect ratio, including square pixels, multiple color modes, and multiple levels of alpha blending. The graphics plane may be programmable in size, screen position, and DRAM memory map position. The graphics plane will also be referred to herein as the drawport. In a case in which the drawport is configured to be smaller than an entire display screen, the area outside the drawport may be set to the background color or can be made "transparent" to allow video to show through. **Suitable variation of factors such as resolution, color depth and drawport size may be used to control the amount of DRAM 40 which is used by the graphics processor 60. The present invention provides a number of graphics modes which require less memory and therefore free up large portions of memory for use in other processing applications.**

In this citation, Mills discusses the graphics processor (60), which is also a part of the ASIC (20). Mills discusses the various graphics modes and resolutions supported by the graphics processor. Mills goes on to discuss that various factors, *e.g.*, resolution, color depth, drawport size, can be varied to control the amount of DRAM that is utilized by the graphics processor.

First, Mills describes the prior art, *i.e.*, it is well known in the art that different format versions require different amounts of memory. In other words, one of ordinary skill in the art would appreciate that image files of different formats have different memory requirements.

Secondly, it is well known in the art that a graphics processor may handle various graphic modes or formats. Typically, handling of various formats is achieved by decompressing the original image formatted in a particular format (RGB, look-up table, *etc.*) and storing this image in a fixed CLUT format for storage and display. In view of

processing and memory constraints, different formats are not typically stored, because this tends to be expensive with respect to allocating system resources. Further, in view of processing and memory constraints, only a single format version is typically stored in the memory. Disadvantageously, there may be an unnecessary loss of image quality if the original image did not need to be converted into a fixed format. (As previously mentioned, one of ordinary skill in the art would understand that image conversions result in data loss, which is detrimental to the quality of the image.) Consider where a CLUT8 image is decompressed and converted into a standard CLUT4 format, there will be a loss of information with the image. The processing of image in CLUT4 renders any re-conversion to a CLUT 8 format unreliable.

In contrast, the present invention determines *whether it is necessary* to convert the original image into a fixed format thereby ensuring the highest quality of an image. Keeping with the above example, the present invention stores the image in CLUT8 format, *in addition* to a CLUT4 format, and the graphics process, depending on the processing and memory constraints, effectuates the CLUT8 or CLUT4 format. That is, the present invention stores both the substantially original version of the image and any secondary converted image in memory, so that the highest quality image can be displayed depending on processing and memory constraints. As indicated by the above citation, Mills does not concern itself with image quality, rather Mills focuses on the memory conservation. (See the emboldened portion of the above citation.)

Again, Mills does not disclose: either (1) a first and second file format version are stored contemporaneously in the memory; or (2) the image file is converted to a second file format version for storage and display based on the capacity of the memory and the

operation of the processor. Mills discloses that different formats pose different memory requirements, which is known in the art. However, Mills does not interrelate the requirements of various formats with the processing and memory constraints, when converting image files, as required by the claims.

Col. 13, line 55+

> FIG. 2B illustrates a direct 4-4-4-4 RGBA mode supported by graphics processor 60. As in the direct 5-5-5-1 mode, a 16-bit RGB color designator is supplied from memory 40 to the graphics processor 60. However, the 16-bit designator in the direct 4-4-4-4 mode includes only 4 bits each of R, G and B and a 4-bit alpha (A) value which directly specifies one of the above-noted nine possible blending values. The 4-bit alpha value utilizes a least significant bit from each of the R, G and B color values. The direct 4-4-4-4 mode thus sacrifices the least significant bit of each of the R, G and B color values to provide a 4-bit transparency weight for each pixel. 12 RGB bits are supplied to an RGB to YUV converter 102 which converts the 12-bit RGB values to a 4:2:2 pixel format. The 4-bit blending value is supplied directly to the mixer 106, which uses the value and the 4:2:2 video and graphics signals to generate a combined video and graphics signal as in the 5-5-5-1 mode described above.

This citation discloses an example of a graphic processing mode. In Figure 2B, the DRAM provides a 16-bit RGB color designator (16), which is *not* an image, to an RGB to YUV converter (102). The output of the RGB to YUV converter (102) is supplied to a mixer (106), which mixes video and graphics signals to generate a combined signal. Once again, this passage clearly fails to show or suggest: (1) a first and second file format version are stored contemporaneously in the memory or (2) the image file is converted to a second file format version for storage and display based on the capacity of the memory and the operation of the processor.

D. Closing Comments

Because Mills fails to disclose the present invention as recited in claims 1 and 16, claims 1 and 16 are patentable over Mills. Claims 2-11, being dependent on claim 1, are likewise patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

IV. Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 11345/020001).

Respectfully submitted,

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